BDA The Association of UK Dietitians
THE OFFICIAL JOURNAL OF THE BRITISH DIETETIC ASSOCIATION
Journal of Human Nutrition and Dietetics

Journal of Human Nutrition and Dietetics

INVITED REVIEW

British Dietetic Association's Obesity Specialist Group dietetic obesity management interventions in children and young people: review & clinical application

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Keywords
adolescent, child, dietetic management, obesity, paediatric, weight management.

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Received 10 July 2020; revised 5 October 2020; accepted 12 October 2020.

How to cite this article
Stewart L.& Easter S.; the BDA's Obesity Specialist Group2020British Dietetic Association's Obesity Specialist Group dietetic obesity management interventions in children and young people: review & clinical application. *J Hum Nutr Diet*. https://doi.org/10.1111/jhn.12834

Abstract

Background: Dietitians play a vital role in the management of childhood obesity. To support that role the Obesity Specialist Group of the British Dietetic Association commissioned a review and clinical application paper. This current paper is a summary of that review document, which is available on the BDA's website.
Methods: The initial sources of evidence were guidelines, published reviews and government guidance. Best practice advice was sought from networks including the BDA's Obesity and Paediatric Specialists groups. The original document was reviewed by a review group and members of the Obesity and Paediatric Specialist group's committees.
Results: The overall aim of dietetic interventions in childhood weight management should be to deliver evidence based dietetic weight management care, which helps maintain positive lifestyle changes. To support this aim the review recommends the UK BMI cut off points in setting service referral and triaging criteria. Ensuring the whole child's world is taken into account when undertaking assessment and throughout the programme process is essential. Dietitians working in this field require behavioural change skills, motivational techniques and the ability to communicate to children of differing ages and their parents. Knowledge of local child safe guarding procedures are necessary for all working in this field. Recommendations on basic and advanced skills required are specified.
Conclusions: This paper was written to compliment a full review document. The complexities around case management, child protection issues and competing family motivations require dietitians trained at undergraduate and postgraduate level to deliver high quality weight management and behavioural change.

Introduction

Dietitians play a vital role in the management of childhood obesity. To support that role the Obesity Specialist Group (OSG) of the British Dietetic Association (BDA) commissioned a review and clinical application paper on childhood weight management in 2018 and it was developed by the authors between February and December 2019 [(1)]. The aim of that document was to explore the current evidence and best practice, to provide an evidence based starting point for dietetic interventions and for discussions with commissioners.

The initial sources of evidence gathered were NICE guidelines [(2,3)], Cochrane reviews [(4–8)], government guidance [(9,10)] and systematic reviews. Best practice advice was sought from the networks of the authors and of the BDA's Obesity and Paediatric Specialists groups.

A review group from OSG members was established. The document was reviewed at three points in its development by a combination of the review group and members of the Obesity and Paediatric Specialist group's committees. The final document was reviewed by all members of the OSG committee and was signed off by the Chairperson. This current paper is a summary of the key points in the review and clinical application document, which has been available on the BDA's website from January 2020.

Dietetic care

The overall aim of dietetic care in childhood weight management should be to deliver evidence based dietetic weight management care, which helps maintain positive lifestyle changes. The programme used should promote a healthier body mass index (BMI) for the child/young person (CYP) and positive healthy family lifestyle changes that should be able to be maintained as they get older.

The referral process and criteria

Managing the referral process is an important aspect of optimising the utilisation of dietetic time and skills. It also ensures that CYP and their families are directed towards the most appropriate services. Working collaboratively with referrers to improve both the referral process and raising the issue of weight [11,12] may have the additional benefit of enhancing other health professionals' understanding of the dietitian's role in the management of child healthy weight.

In the United Kingdom (UK) there are recognised tier 2 CYP's weight management programme which tend to be community based and most often groups. Tier 3 is the specialist multi-disciplinary weight management services. Referrals into CYP weight management tier 2 or 3 services is usually based on the CYP's current BMI. The agreed cut offs for clinical use in the UK are:

- $\geq 91^{st}$ BMI centile for overweight
- $\geq 98^{th}$ BMI centile for obesity [3,13,14]

For children aged up to 4 years the World Health Organisation (WHO) BMI data is used and for those 4 years plus the UK 1990 BMI data is used [3,15]. The current CYP's UK BMI charts include a 99.6^{th} centile line and further SD score lines which are helpful for more drilled down referral criteria and triaging. Table S1 outlines the current centile and SD lines on the UK BMI centile charts and their clinical definitions. Waist circumference is not recommended to be used as a measurement for referral, as there is no agreed cut off points for clinical significance [2]. In practice it can be a useful tool to use for monitoring progress during an intervention.

Services should consider their pathway for CYP with a BMI $\geq 91^{st}$ BMI centile (WHO/UK1990 BMI centile charts), when the referrer believes the patient would benefit from the expertise of a dietitian and that the parent/carer is willing and able to interact with the programme.

Currently in the UK there are no recognised cut off points for defining tier 2 and tier 3 child weight management services. We suggest that tier 2 would be for CYP with a BMI $\geq 91^{st}$ BMI centile with no significant psychosocial and special needs. While, tier 3 would be for those with a higher BMI for example $\geq$ 3SD or 3.33SD line using the WHO/UK1990 BMI centile charts. In addition, a tier 3 service should be given to those with a BMI $\geq 91^{st}$ centile:

- With increased medical risk e.g. metabolic syndrome, cardiovascular disease (CVD) risk, type 2 diabetes, sleep apnoea, non-alcoholic fatty liver disease (NAFLD)
- With a suspected underlying endocrine cause e.g. short for stature
- With complex social, psychological and special needs
- Who are under 2 years with excess weight; for a child of this age the dietitian should enter into discussions with a paediatric endocrinologist [13]
- Where safeguarding/child protection issues are raised or when attending the service is part of a child protection plan.

Assessment

The assessment session should be used to start building rapport with the CYP and their parents [16] as well as obtaining clinical information. Some of this information may be collected over the first one to two sessions depending on whether the programme includes a parent only first session. An initial parent only session can allow the parent a 'safe space' to discuss aspects of their child's weight and their concerns, in practice this can be very informative. At this early stage and throughout the process it is important to emphasise a whole-family approach to behaviour change wherever possible, especially for younger children.

At the assessment it is fundamental to explore and obtain information that gives a full clinical picture as well as the holistic view of the CYP's health and well-being [17,18]. The BDA's Model and Process for Nutrition and Dietetic Practice (2016) is a good process to use as a template for recording in case notes to ensure that these points are all covered [19].

The following should all be discussed and recorded to help build a picture [17,18]:

- BMI – plot on a BMI centile chart (WHO/UK 1990) and the range noted e.g. BMI between 99.6^{th} centile and 3.0 SD

Table 1 Summary of Cochrane Reviews' conclusions on CYP's programmes

Age range	Number of trials in Cochrane review	Mean different in BMI SDS [4]	Cochrane Review	Conclusion
<6 years	7	−0.3	Colquitt et al. 2016 [5]	Low quality evidence with high risk of bias. Multi-component interventions appear to be effective treatment options.
6–11 years	70	−0.04	Mead et al. 2017 [6]	Low quality evidence, high risk of bias. Multi component behavioural change interventions that incorporate diet, physical activity and behavioural change may be beneficial in achieving small, short term reductions. Post intervention follow up important.
12–17 years	44	−0.13	Al-Khudairy et al. 2017 [7]	Low quality evidence Multidisciplinary interventions involving a combination of diet, physical activity and behavioural change reduced BMI and moderate quality evidence reduced weight in overweight and obese adolescents.

- For children under 2 years – plot weight and length on growth centile charts (WHO/UK 1990)
- Weight history patterns, including any previous attempts at weight control
- Diagnosed comorbidities such as hypertension, hyperinsulinaemia, dyslipidaemia, type 2 diabetes, fatty liver, intracranial and exacerbation of conditions such as asthma
- Weight-related symptoms present such as exercise intolerance, shortness of breath, acanthosis nigricans, sleep apnoea and joint pain.

In childhood obesity it is important to ensure that the CYP's world is viewed from a holistic perspective. The dietitian also has a responsibility to remain aware of any issues or concerns which may relate to safeguarding and child protection. Therefore, at assessment it is necessary to consider wider issues around family structure, social interactions, areas related to self-esteem such as bullying, poor social interaction and any other concerns for the CYP's safety [20,21]. These should be explored during assessment and as necessary throughout the programme. In Scotland the Getting It Right For Every Child (GIRFEC) tool is a good example of a systematic assessment methodology to review the CYP's world holistically [22].

A comprehensive behavioural lifestyle assessment is important. The areas listed below are standard areas to explore with most CYP and their parents [17]:

- CYP's understanding of obesity
- Parents' understanding of obesity
- Potential barriers to change
- Current lifestyle: dietary intake, physical activity levels and time spent in sedentary behaviours
- Support networks, including extended family, school and friends
- Reward systems/strategies used to reinforce new behaviours

Although the main assessment tends to take place at the initial appointment it is possible to stage the process across visits and this may be necessary in those individuals with a complicated social and medical history as well as for the older young person particularly teenagers.

Programme design and organisation

There is no clear evidence on what makes the most effective programme for managing childhood obesity. NICE (2014) do not suggest any particular format to deliver programmes aimed at CYP merely the components required. They do interpret a lifestyle weight management programme as being one that is likely to aim for weight maintenance whilst supporting appropriate linear growth [2].

There is a well-recognised association between health, social inequalities and food insecurity and the prevalence of childhood obesity in the UK. A dietetic service and/or pathway requires to take this in to consideration and services should be accessible to all [9].

Given the potential numbers of CYP who could meet the referral criteria, there may be an access and economic preference to offer group sessions rather than a 1:1 format. However, those CYP with a higher BMI and more complex social, medical and special needs may benefit from 1:1 sessions. Hayes et al. (2015) reviewed a number of group programmes with or without an individual contact element. Those programmes with an element of individual contact were more successful, with a loss of 0.25 BMI SD score points [23].

NICE states that there should be "adequate time in the consultation to provide information and answer questions" [3]. As an example the SCOTT 1:1 dietetic programme for children aged 8–15 years, offers two initial 1 h consultations followed by a further eight review sessions of 30 min [24]. While, as an example of a group

programme, the MEND group programme for 7–13 year olds offers 2 h long group sessions over 10 weeks [25].

There appears to be some suggestion that programmes with more frequent contacts are more effective [26]. Public Health Scotland (PHS) have stated as essential in their standards of CYP weight management care that sessions should be delivered weekly or fortnightly and as essential that all interventions, groups or 1:1, have a minimum of eight sessions [9]. Ho et al. (2012) in a systematic review found that changes in weight and BMI SD scores were greater when the duration of a programme was longer than six months [27].

Recent Cochrane reviews have shown the efficacy of programmes aimed at differing age groups [4] and these are briefly summarised in Table 1. Loveman et al. (2015) found that parent only programmes had similar effects to parent and child programmes [8].

Programme components – Evidence of what works

Guidelines state that CYP and their parents seeking weight management should be offered evidence-based, personalised, specific, age and culturally appropriate advice [3,10]. Evidence suggests that multi-component weight management programmes are beneficial in achieving small to moderate reductions in body weight status in CYP and should have on-going follow up support after completion [4,26].

Dietary component

All dietary components of a weight management programme aimed at CYP should ensure an intake of a balanced diet in line with the Eatwell Guide [28] with age appropriate intake of protein, vitamins and minerals [29].

A 2017 report for the WHO suggested that targeting specific dietary components such as sugar sweetened beverages (SSB) or energy dense nutrient poor (EDNP) rather than general healthy eating advice was more effective for weight management. Sustaining these dietary changes long term had the potential to improve energy balance and decrease BMI SD score. It recommended that at the point of discussion with the CYP and their family potential dietary changes should be discussed as foods and not as nutrients [30].

Gow et al. (2014) showed that no particular macro nutrient manipulation was more effective than any other, the most important aspect was a decrease in total energy [31]. Ho et al. (2012) noted that the most popular method of energy control was using a traffic light or modified traffic light approach [27]. The authors also noted that a few studies had taken the approach of aiming to reduce total energy intake by 30 or 15 %, demonstrating effective weight loss across different age groups, settings and countries [27].

Styne et al. (2017) suggested particularly targeting decreasing snacking within the target of decreasing the overall energy intake [32]. A systematic review by Avery et al. (2017) showed that there was an association between CYP watching TV with a poorer dietary intake and weight gain. In particular a positive association was seen between watching TV and eating EDNP foods such as pizza, fried foods and sweets [33].

Physical activity

Incorporating physical activity is an important aspect of a programme [3,9]. How this is achieved will vary by delivery, age of the CYP and local circumstances. For some the physical activity will be delivered to the individual CYP, to groups of CYP or to the CYP and their parents/family. For group programmes the physical activity element is usually integrated into the group sessions. Whereas for 1:1 programmes the physical activity is typically delivered at a separate session and often by a partner organisation such as a local leisure service. In 2019 the UK Chief Medical Officers updated the recommendations for physical activity and decreasing sedentary behaviours across age groups [34], see Table S2. This guidance states that CYP should reduce time spent in sedentary behaviours and try where possible to replace this time being physically active [34]. Typically in CYP weight management the suggestion has been that sedentary behaviours most notably screen time should be no more than 2 h per day [13].

Behavioural change techniques

It is recommended that all CYP weight management programmes should include behavioural change aspects [3,4]. Behavioural change tools that have been successfully incorporated into CYP's weight management programmes include:

- Self-monitoring
- Stimulus control
- Goal setting
- Rewards
- Problem solving [18,35]

Sahota et al. (2010) noted the importance in programmes of ensuring that parents use praise, role modelling and positive social reinforcement with their children [35]. Supporting parenting in these skills of positive, authoritative parenting approach is known to be a successful component of CYP weight management [3,36].

Rapport and attitudes to obesity

Weight bias and negative attitudes towards obesity is well documented [37]. Pont et al. (2017) found a number of studies documenting that CYP living with overweight and/or obesity were bullied far more than their peers at a healthy weight [38]. It is recognised that the language used in referrals and consultations can have a large impact on the CYP and their family. Faircloth et al. (2019) found when surveying parents, the term "unhealthy weight" was non-offensive whilst stimulating the need for change whereas "obese" was offensive [39]. The American Academy of Pediatrics 2017 policy statement raised awareness of the stigma experienced by CYP with obesity. They suggested terms such as "unhealthy weight" or "very unhealthy weight" rather than "obese" and "morbidly obese" along with using people first approach at all times [38].

Stewart and Gillespie (2019) discuss the importance in childhood weight management on developing rapport with the CYP and their parents. Rapport can be developed through being:

- Non judgemental
- Positive
- Enthusiastic
- Sensitive [40]

Referral to Child and Mental Health Services (CAMHs)

Referral to CAMHs can be an important part of some CYP's weight management therapy. Prior and current experiences may lead to CYP having an unhealthy and unhelpful relationship with food and eating behaviours. A dietitian needs to be able to recognise behaviours and attitudes which require input from CAMHs. To achieve smooth referral and communication during treatment it is ideal for there to be an agreed pathway between the CYP weight management and CAMH's services [9]. The gold standard would be to have a paediatric clinical psychologist dedicated or embedded within the CYP weight management team.

Child and young people with learning disabilities

All CYP's weight management programmes should be accessible and a group which requires particular consideration are CYP with learning disabilities and special needs. It is recognised that there is a higher prevalence of overweight and obesity in those with learning disabilities (LD) [41].

LD is a broad term and will encompass those who, with some support, will be able to successfully engage with mainstream services through to those who require a programme to be delivered via their parent/carers. Dietitian's delivering CYP weight management services therefore, need to ensure that the facilities used can accommodate people with a range of physical and learning difficulties. Resources and handouts need to be appropriate for young people with LD and dietitians require to have the skills to communicate effectively with this group. Dietitians should have an understanding of the associations between overweight and obesity and various hereditary and endocrine conditions [42]. Reversing a trend of weight gain or the slowing down of weight gain can often be seen as successful clinical outcomes in CYP with LD.

Child protection and safeguarding

It is becoming increasingly acknowledged that obesity in CYP could be classed as a form of neglect. There are national guidance and laws around child protection in the four nations of the UK. The National Society for the Prevention of Cruelty to Children (NSPCC) website https://learning.nspcc.org.uk/child-protection-system/ is a useful place for further information regarding child protection systems.

Undermining care plans, pseudo compliance, poor attendance, blame towards the CYP should all be thought of as indicators towards neglectful behaviour and it is especially important to ensure joined up working between the dietetic service, other health services and schools [43]. Other forms of child abuse such as physical, sexual and emotional can be associated with forms of disordered eating and increased levels of overweight and obesity in CYP [44]. Dietitians working with CYP need to be fully aware of possible child abuse warning signs and of their local procedures for escalating concerns.

The Manchester serious case review (2018) suggested that the Viner et al. (2010) framework for practice is used as a helpful guide when trying to assess if a case needs escalating and gives a summary of possible associations with child abuse and risk of developing obesity [45,46].

Equipment and environment considerations

Levels of anxiety may be high prior to and during visits to the dietitian, particularly the first appointment. Anticipating the CYP's possible needs and attempting to create a physical environment that welcomes rather than challenges, is an important aspect of the sensitive care of CYP with obesity, Table S3 gives recommendations on equipment and environment. It may be helpful to try and offer all or some appointment times outside of normal school hours.

Maintenance of behaviour changes

For the vast majority of CYP referred for weight management in tier 2 and the pre-teenagers in tier 3 the clinical outcome is a maintenance of their weight, growth in height and thus a decrease in BMI and BMI SD score [15]. Therefore, for these CYP at the end of the active programme the ideal maintenance stage should be to continue growing in height with weight remaining stable or rising slowly until their BMI is in the healthy BMI range (<91st BMI centile) or in a lower BMI range than at referral. Whereas, for some teenagers in a tier 3 programme who have lost weight they require support to maintain the weight lost and the reduction in BMI and BMI SD score.

In order to continue this move towards the healthier BMI range the CYP and their family need to maintain the targeted behaviours they have changed during the active programme stage. Both NICE [3] and PHS [9] recommend continuing post programme monitoring and support. This may be achieved via face to face sessions, digital communication, via telephone or a combination.

Pharmacological management

There is currently no medication licenced for the use in CYP to treat obesity. The NICE and SIGN guidelines [3,13] offer advice around the restricted use of Orlistat when additional action is needed in conjunction to diet and lifestyle advice, for those 12 years and over. Metformin has also been used, again off licence, as a weight loss medication for CYP [47]. The systematic review of McDonagh et al. (2014) found that metformin with lifestyle changes could lead to a BMI reduction which was small but statistically significant [48].

Surgical treatment

Bariatric surgery is not common practice with CYP in the UK. However, for post-puberty young people who have a BMI > 40kg m^{-2} and have taken part in a diet and lifestyle programme for 6 months, it could be considered via a specialist team [3,13]. This should only be conducted by a specialist team given the lifelong implications of bariatric surgery.

There is limited, but growing, data on the effectiveness of bariatric surgery in this age group. In the Cochrane review on the effects of surgical treatment, only one randomised control trial met the inclusion criteria [49]. Whilst the data showed greater weight loss at 2 years in those who had a gastric band procedure [34.6 kg vs 3.0 kg], the strength of evidence based on one study is not sufficient to alter clinical practice [50].

Table 2 Basic and advanced skills required of a dietitian working in child weight management

Basic skills	Advanced skills
Basic behavioural change	Advanced behavioural change technique and skills
Active listening	Complex case management (medical and social)
Group delivery (if working with groups)	Positive parenting facilitating skills
Safe guarding/child protection	Understanding of eating disorders in children and young people
GIRFEC (Scotland) [22]	Ability to work and communicate effectively with CYP with learning disabilities
Trauma informed training [56-58]	To have sufficient skills and knowledge to be a source of information and training to gatekeepers and others on childhood obesity and raising the issue of weight
Understanding and knowledge of norms of eating, eating patterns and developmental milestones at various age stages and development [59,60]	Skills to report on outcomes and outputs for monitoring and evaluation [52]
Understanding and knowledge of disordered eating in children and young people	
Trained on appropriate techniques to take weight and height measurements in children and young people	
Plotting and interpretation of WHO/UK 1990 growth and BMI chart	
Age appropriate communication with CYP	

Evaluation of weight management programmes

Evaluating a CYP's weight management programme is essential in ensuring the delivery of high-quality weight management. This requires systems to be put in place which facilitate data collection and ongoing monitoring [51,52].

It is important to understand that although collection of weight, BMI and BMI centile are important in clinical monitoring, for evaluation BMI SD score is the most relevant outcome [15,51]. For other outcomes such as changes in physical activity levels, dietary patterns and mental well-being only validated tools which are workable in clinical practice should be used and the National Obesity Observatory (NOO) 2011 report is particularly helpful. [51,53,54]. Table S4 contains a summary of examples of

tools for measuring diet and physical activity in young people from the NOO (2011) publication.

Clinical outcome measures are commonly considered when evaluations are planned but of equal importance are qualitative measures which explore patient reported experience (PREM's) and patient reported outcome measures (PROMS). Qualitative evaluation and 'patient stories' are often a powerful tool for demonstrating the day to day outcomes which are most relevant to the CYP and their families [55]. Consideration should also be given to demonstrating a systematic method of ensuring fidelity to the programme and that it is being delivered as planned across all delivery sites [8,50,55].

Training and life long learning

Dietitians working in this field should be able to identify themselves as paediatric dietitians or improve their knowledge in this area. It is recommended that the BDA's Paediatric Specialist Group's and the Plymouth University's MSc Advanced Professional Practice in Paediatric Dietetics Module 1 Nutrition and Dietetics in Infancy and Childhood course is undertaken by any dietitian working in child weight management, as soon as possible after commencing this role.

Behaviour change skills are an essential skill when dealing with weight management, both within the adult and paediatric field. Stewart et al. (2008) found that parents perceived the treatment programme more positively when these skills were used and a rapport was formed with the dietitian [16]. Table 2 outlines the recommended basic and advanced skills required of dietitians working in this field.

Conclusions

This paper sets out to provide a summary of evidence and commentary in relation to the dietetic weight management for CYP. It was written to compliment the full review document which is in it's self a starting point to guide discussions with commissioners, senior managers and dietitians on weight management services for CYP and their families. As with all areas of paediatric dietetics there are many challenges in working in CYP weight management, although it can be an immensely rewarding field of dietetics. The complexities around case management, child protection issues and competing family motivation should not be underestimated by managers and commissioners.

To ensure the highest quality of weight management for CYP and their families investment in training at an undergraduate and postgraduate level, particularly in relation to interpersonal and advanced behavioural skills, is an essential aspect of maintaining and extending the various roles of dietitians in CYP weight management.

Acknowledgements

The authors would like to thank Michelle Hanchard, Ceris Devereux, members of the BDA Obesity Specialist Group and members of the BDA Paediatric Specialist Group for reviewing the original work. Dr Clare Grace RD, Relish Nutrition Consultancy, as the original review document was structured and based on the adult Obesity document she wrote for the OSG. Dr Amanda Avery for her insightful comments with the original review document and this manuscript. Dr David Stewart for help with admin for the original review document work and this manuscript. The original work for the review document was funded by the BDA's Obesity Specialist Group.

Conflict of interests, source of funding and authorship

Dr Laura Stewart works as a freelance dietitian, consulting and training on childhood and adult obesity programmes and services. Laura Stewart is a current member of the OSG committee. Laura Stewart and Shelley Easter were commissioned on a paid basis by the BDA's Obesity Specialist Group to write the original review document.

No funding declared.

This work was conceived and commissioned by the BDA's Obesity Specialist Group (OSG). Laura Stewart and Shelley Easter carried out the review, wrote the original review document and this manuscript. The final version of this manuscript has been approved by all authors and the OSG. All authors critically reviewed the manuscript and approved the final version submitted for publication.

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Supporting information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1. Clinical diagnostic criteria for overweight and obese children and young people (aged < 18) in the UK (Based on Gagahan & Stewart 2018) [(15)].
Table S2. Summary of UK recommendation on physical activity levels for children and young people 2019 [(34)].
Table S3. Recommended environmental factors for clinical areas.
Table S4. Summary of examples of tools for measuring diet and physical activity in children and young people. (Taken from NOO 2011) [(54)].

